City of Phoenix

Rio Salado, Rio Salado Oeste Phoenix, Arizona Ecosystem Restoration Project

H&H for Planners
February 2011

Study Area

Salt River Watershed

15,000 square miles

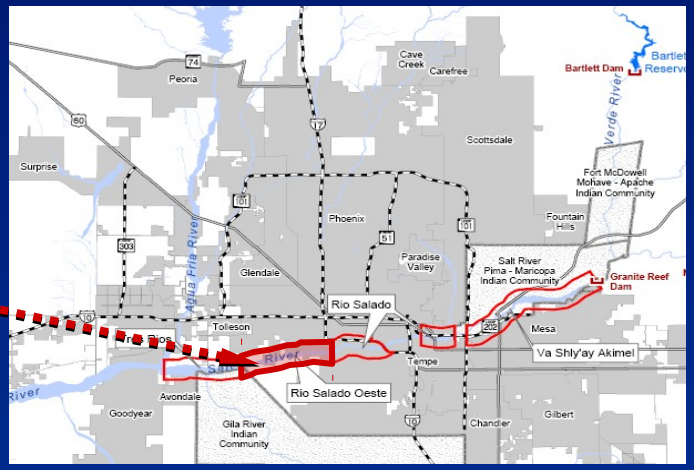
Joins Gila River west of Phoenix

Downtown Phoenix

(19th AVE to 83rd AVE - **8** miles)

Other USACE Projects

Tres Rios / Rio Salado / Va Shly'ay Akimel



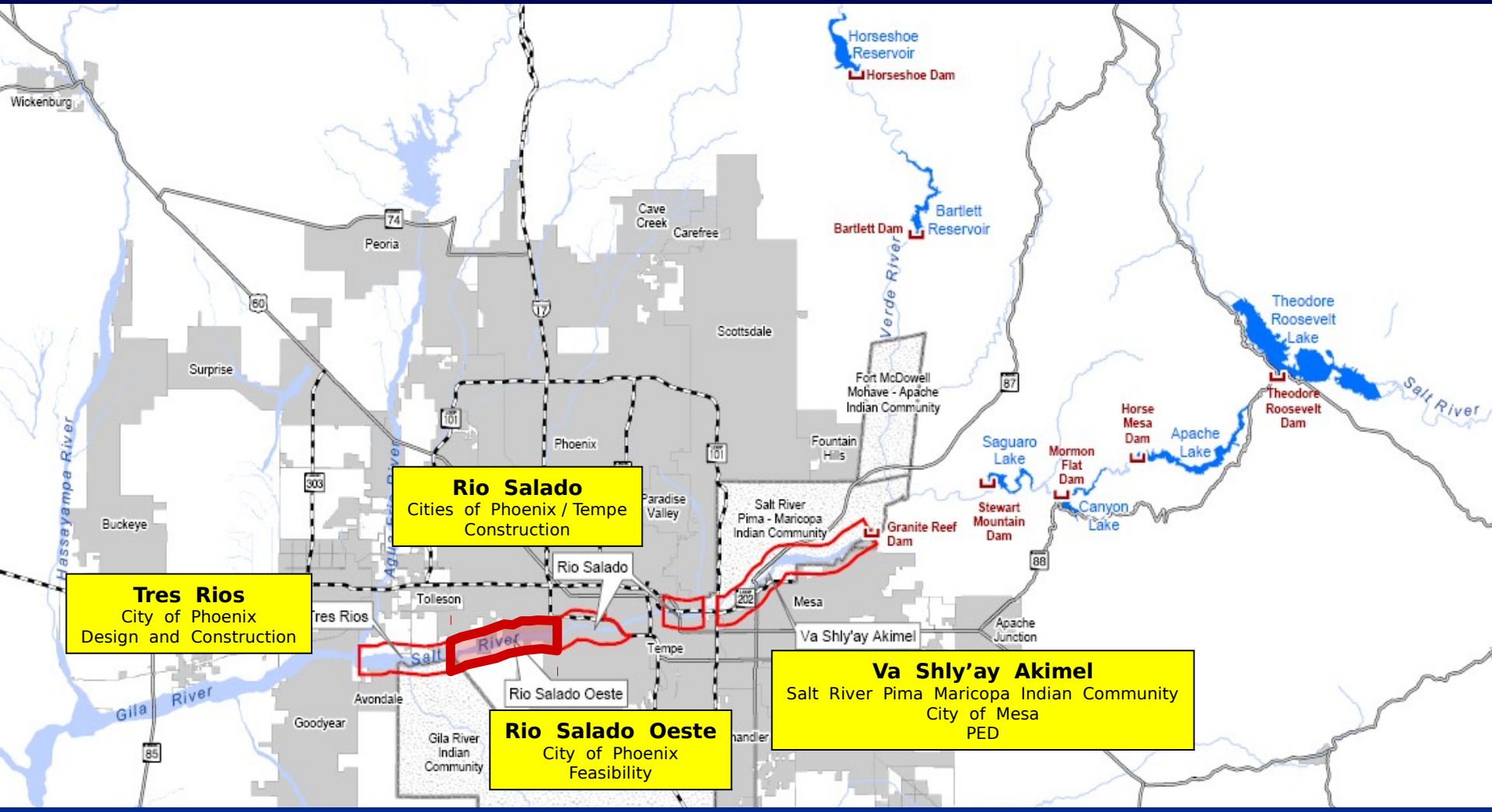
Greater Phoenix, AZ Metropolitan Area

and

Salt River Project System

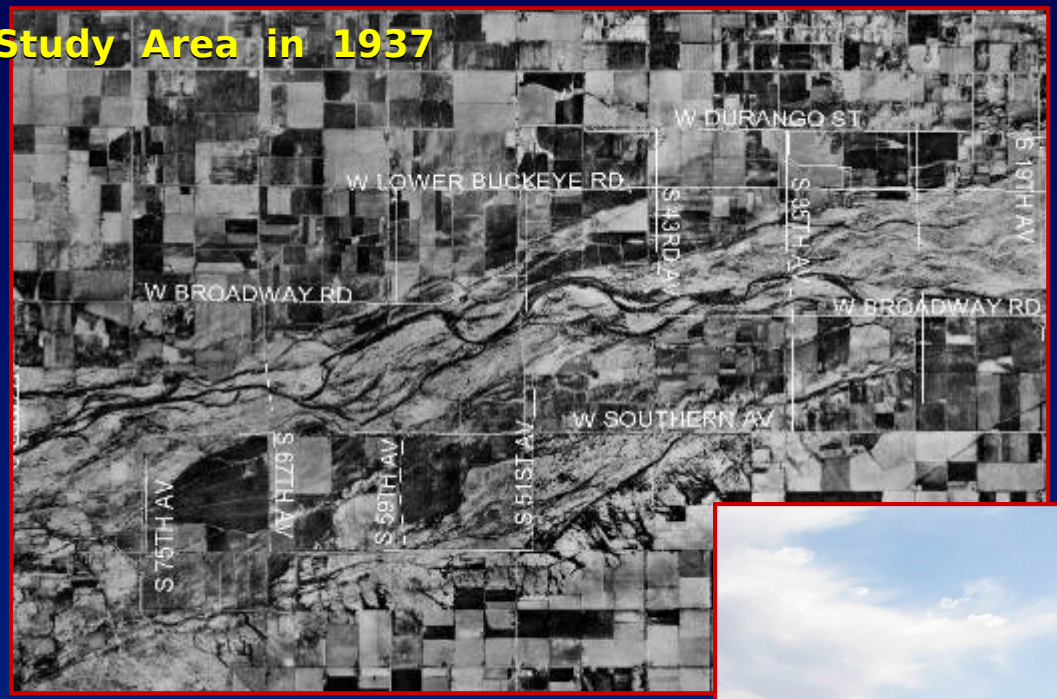
Study Area

Salt River Watershed, **Rio Salado Oeste**, Phoenix, Arizona



Greater Phoenix, AZ Metropolitan Area
and
Salt River Project System

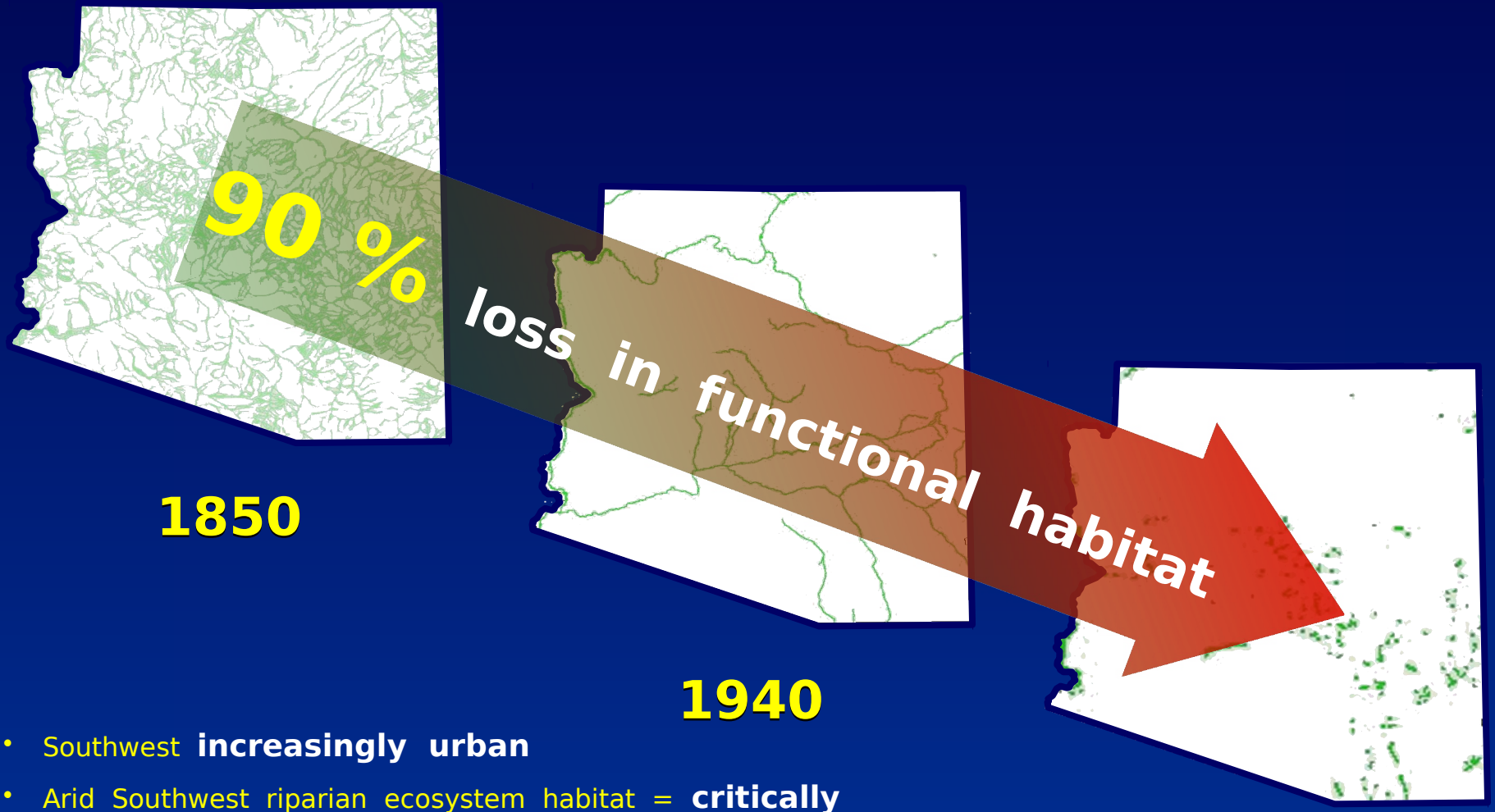
Historic Conditions



- Perennial stream
- Shallow groundwater
- Meandering channel
- Emergent wetlands
- Cottonwood - Willow
- Mesquite

Southwestern Riparian Trend

Salt River Watershed, **Rio Salado Oeste**, Phoenix, Arizona



- Southwest **increasingly urban**
- Arid Southwest riparian ecosystem habitat = **critically endangered**
- Cottonwood-willow riparian forest = **most threatened ecosystem in the Nation** (Nature Conservancy)

Existing Conditions

Salt River Watershed, **Rio Salado Oeste**, Phoenix, Arizona

Legend
- Residential
- Commercial/Industrial
- Landfill
- Sand/Gravel Operation
- Agricultural
- Recreational
- River Bottom/Native

Existing Land Use
Groundwater Quality and Hydrogeology Report
Rio Salado Oeste Project

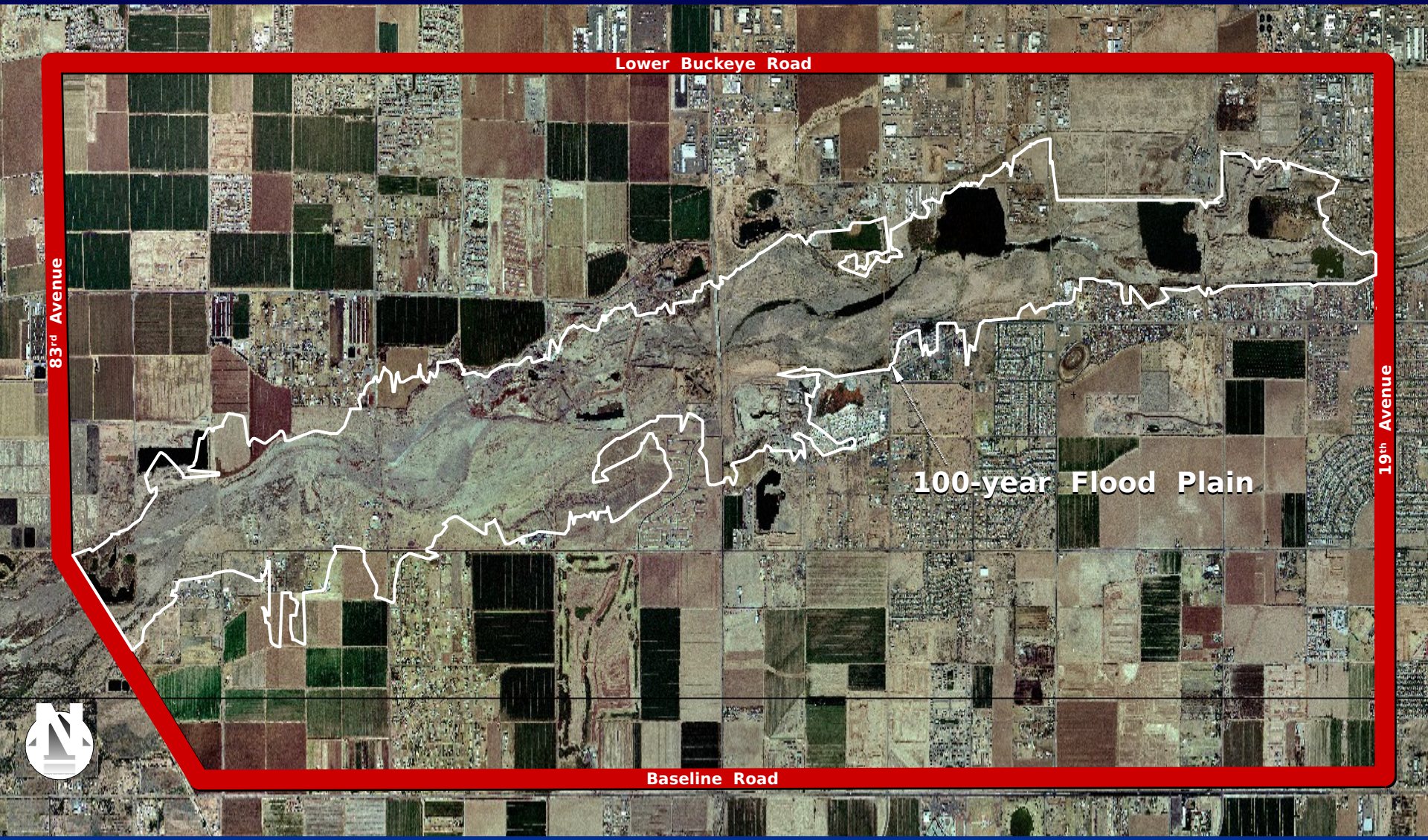
N

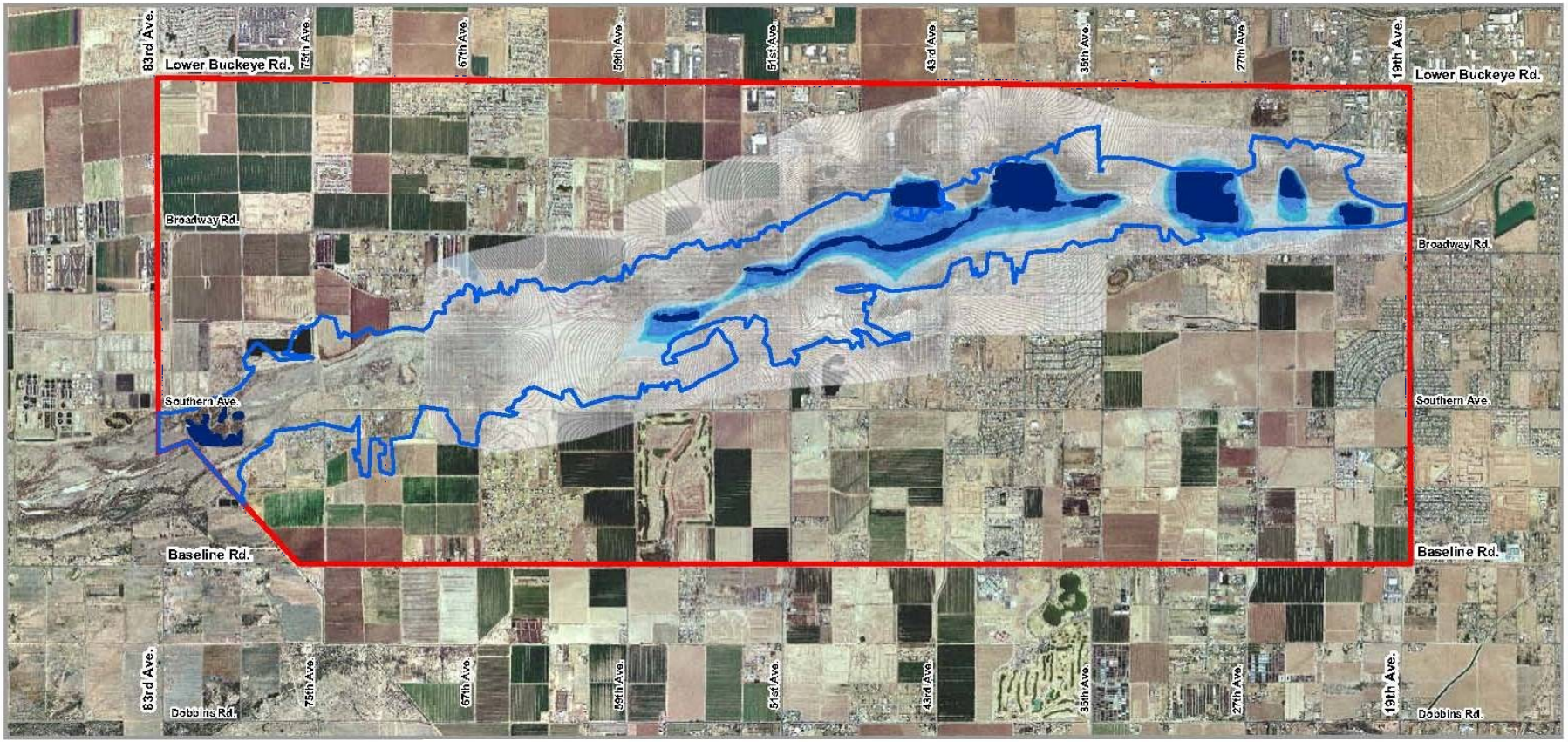
Figure 1

US Army Corps of Engineers ®
Los Angeles District

Project Area

Salt River Watershed, **Rio Salado Oeste**, Phoenix, Arizona





Legend

- Project Study Area
- Project Implementation Area

Depth to Groundwater

- Surface Water
- 0 - 3 Feet
- 4 - 5 Feet
- 6 - 10 Feet
- 11 - 112 Feet

March 2005

DEPTH TO GROUNDWATER

Rio Salado Oeste

Figure IV-4

N W E S

0 5,000 10,000

Feet

US Army Corps of Engineers

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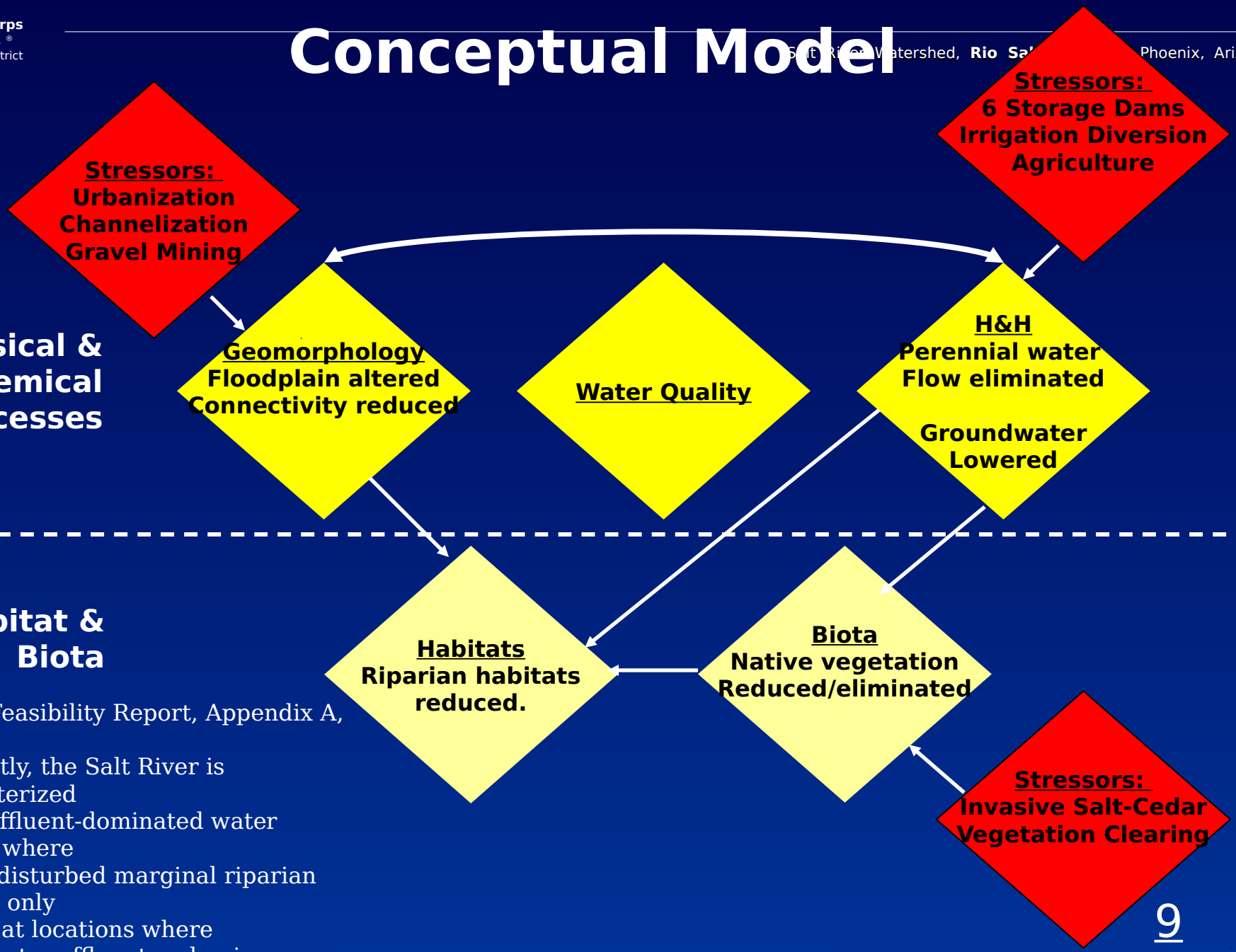
Conceptual Model



From Feasibility Report, Appendix A, pg 13
Currently, the Salt River is characterized
as an effluent-dominated water course where
highly disturbed marginal riparian habitat only
occurs at locations where wastewater effluent and nuisance

Goal – provide diverse habitat types that naturally occur in a Sonoran desert riparian system.

Objective	Habitat Type	Criteria
Restore riparian habitat including:	Mesquite	Mesquite Habitat is found on upper terraces of floodplain, above the active channel (low water demand).
	Cottonwood/willow	Cottonwood and Willow Habitat is found along river banks or at approximately the 2 year flood level (moderate water demand)
	Wetland Marsh	Wetland-Marsh Habitat is found at the lowest elevations in shallow ponds or saturated soils (high water demand)
	Aquatic Strand/Scrub	Aquatic Strand/Scrub Habitat is found in the channel and along the channel border (high water demand
	Open water	

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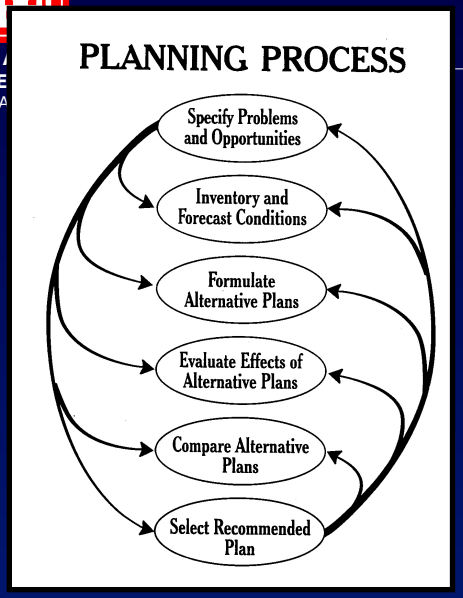

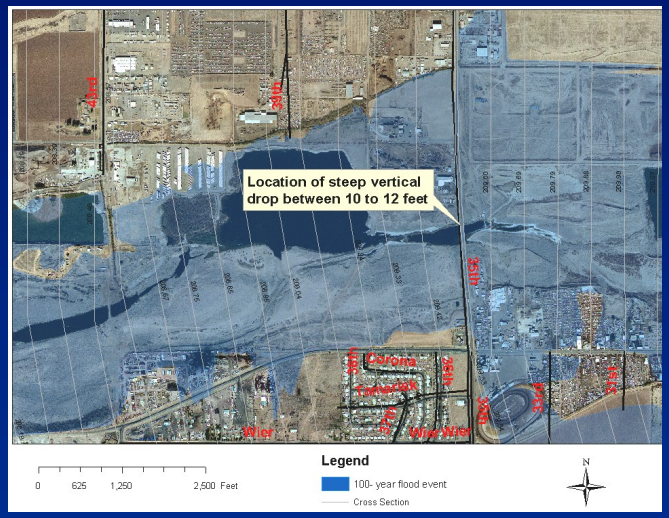

- Model used during planning
  - H&H:
    - HEC-RAS for water surface profiles, bridge scour
  - Geomorphology:
    - Stable-channel approach initially used (EM 1110-2-1418, 1994)
    - Sediment Transport: Used HEC-6T to predict scour or deposition over a 25 year period
    - Scour: Used HEC-RAS and Federal Highways guidelines
  - Water Quality: None
  - Vegetation: None, though an HGM type of philosophy was used.
  - Biota (Ecological Response)
    - HEP

Formulate Alternative Plans

Factor considered	Design Considerations
River Function	In an urban, high energy setting, river function had to be modified based on habitat, bank stability, and flooding concerns. One of the goals was to design a low flow channel having "soft sides and bottom" that would convey the design discharge of 12,200 cfs.
Habitat	Stage-discharge-frequency relationship had to provide conditions favorable to floodplain vegetation with occasional flushing of floodplain during larger flood events. Irrigation water is needed to get floodplain vegetation started.
Bank Stability	Bank erosion and channel migration had to be limited
Flood Impacts	No change in 100-year flood elevation. Overbank "n" increased to check sensitivity
Groundwater	To meet NPDES requirements, salinity levels must be kept low so that native trees aren't impacted. Operations must not cause groundwater migration and bank erosion must be kept to a minimum especially in the vicinity of 13 existing landfills
Other	FAA had 10,000 foot open water constraint to prevent attracting waterfowl and larger birds

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Recommended Plan - Alt 5A

Salt River Watershed, **Rio Salado Oeste**, Phoenix, Arizona

Before

Water supply
(*Storm water / effluent*)

River channel restored

Revegetation

Invasive species removed

Gravel pits restored
(*in floodplain*)

Acres Restored

Cottonwood - Willow (**375**)

Mesquite (**417**)

Wetlands (**190**)

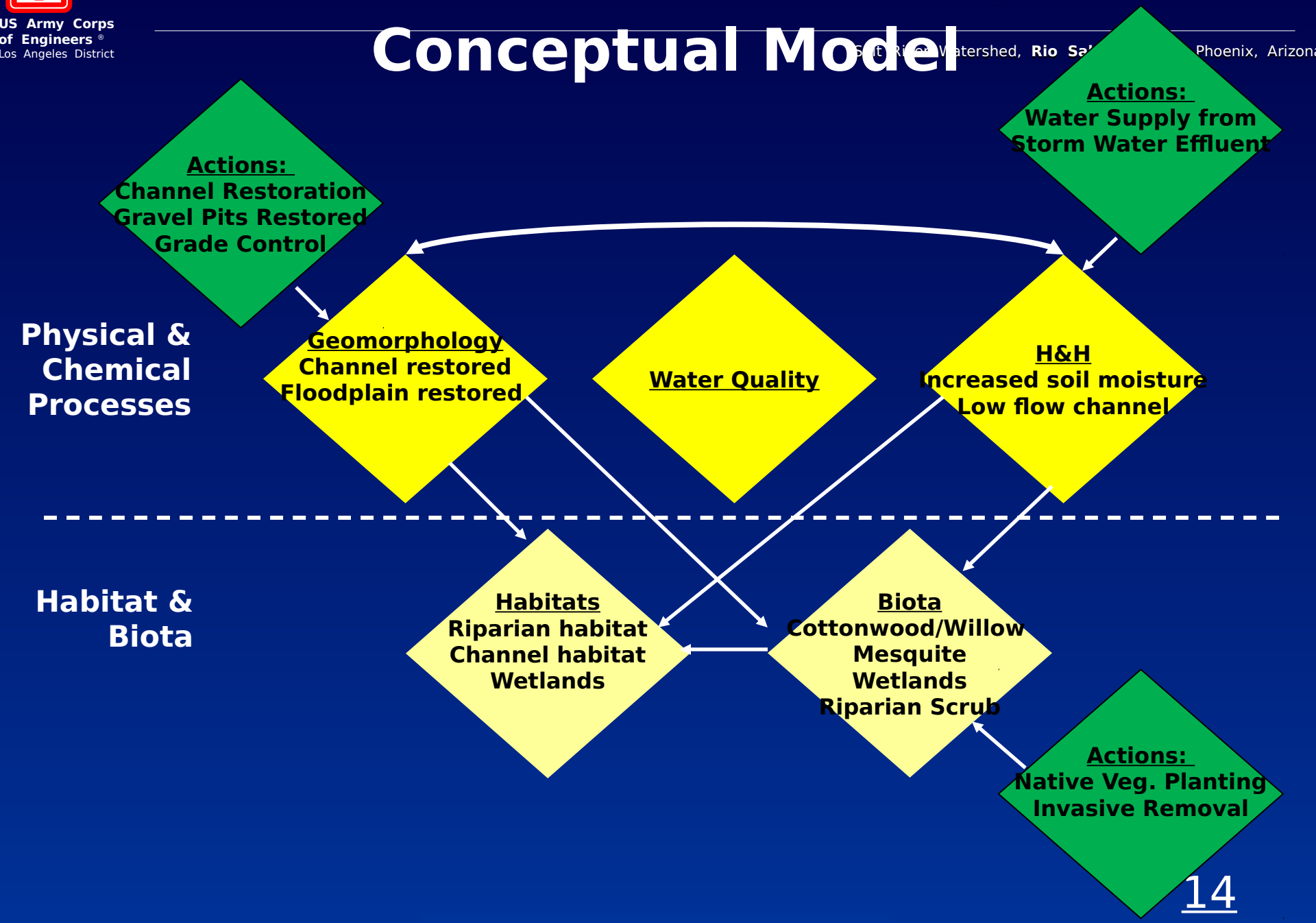
Riparian Scrub (**296**)

Scrub shrub (**56**)

Channel (**170**)

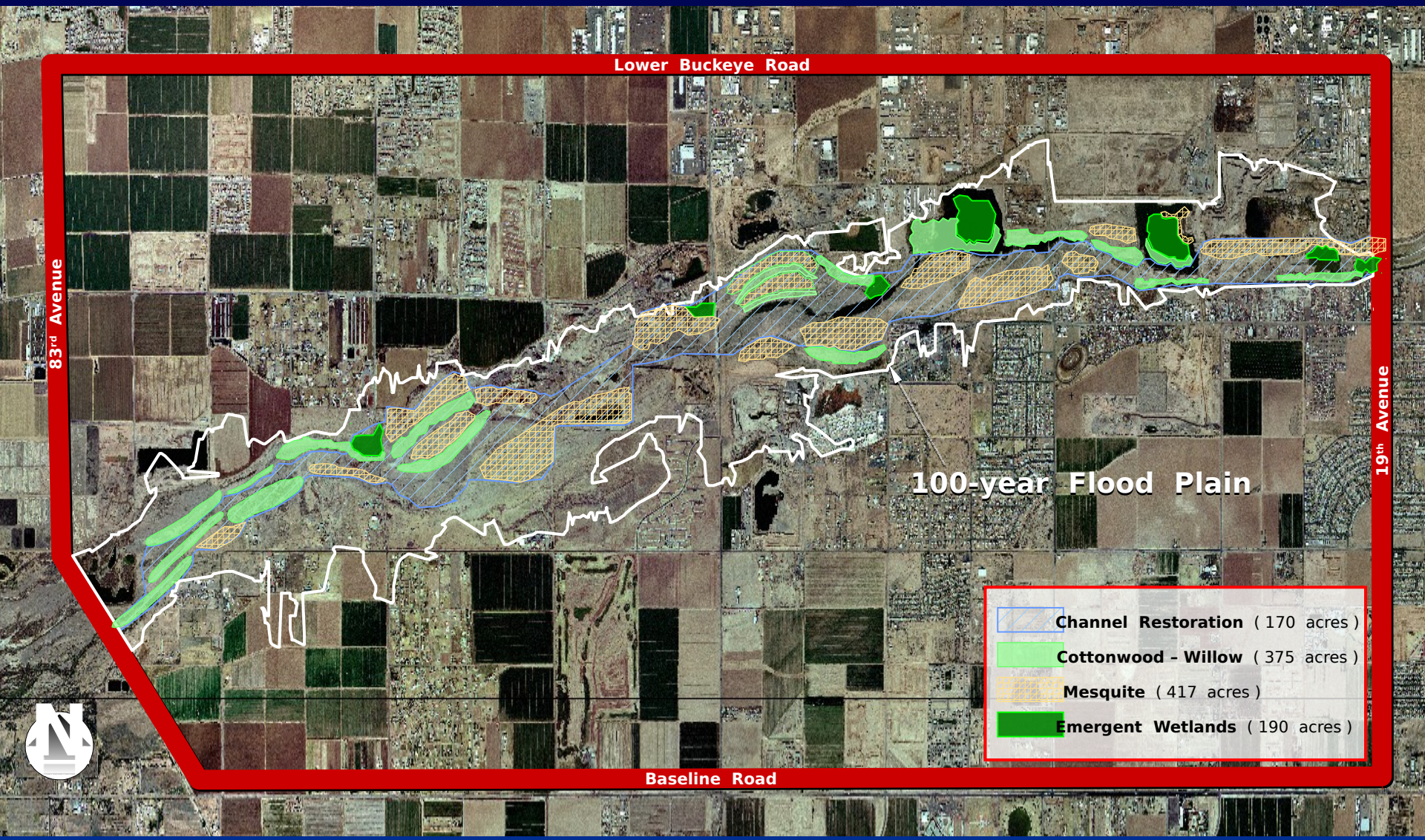
After *(Rio Salado Examples)*

Conceptual Model



Recommended Plan - Alt 5A

Salt River Watershed, **Rio Salado Oeste**, Phoenix, Arizona

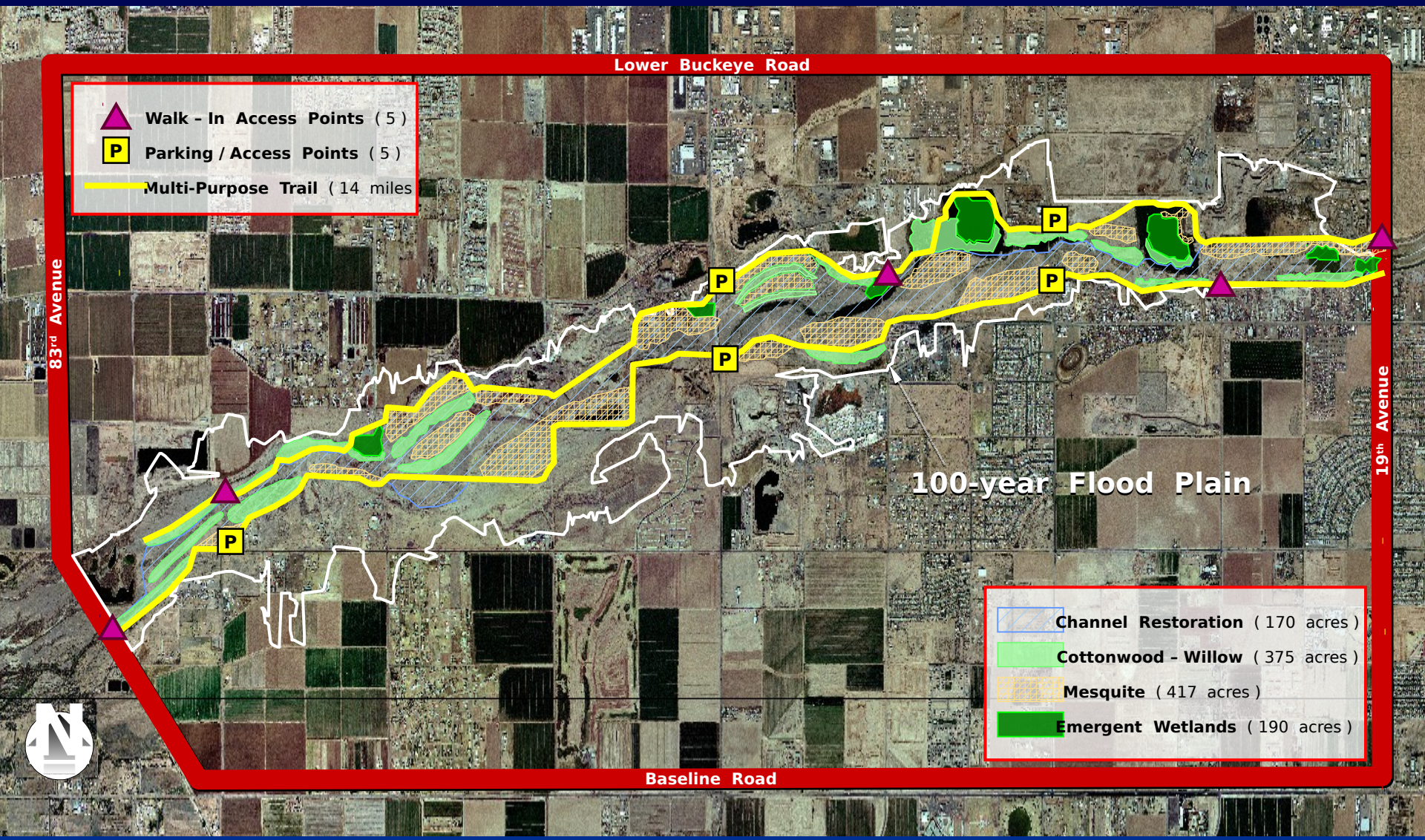

Lower Buckeye Road
83rd Avenue
19th Avenue
Baseline Road
100-year Flood Plain
Channel Restoration (170 acres)
Cottonwood – Willow (375 acres)
Mesquite (417 acres)
Emergent Wetlands (190 acres)

0 1 2 3

Miles

Recreation Plan

Salt River Watershed, **Rio Salado Oeste**, Phoenix, Arizona


Lower Buckeye Road
83rd Avenue
19th Avenue
Baseline Road
Walk – In Access Points (5)
Parking / Access Points (5)
Multi-Purpose Trail (14 miles
P
100-year Flood Plain
Channel Restoration (170 acres)
Cottonwood – Willow (375 acres)
Mesquite (417 acres)
Emergent Wetlands (190 acres)
N

0 1 2 3

Miles

Revegetation

Salt River Watershed, **Rio Salado Oeste**, Phoenix, Arizona

Cover Type	Acres
Cottonwood - Willow	(**375**)
Mesquite	(**417**)
Wetlands	(**190**)
Riparian Scrub	(**296**)
Scrub shrub	(**56**)

Revegetation with native species at appropriate sites throughout project area.

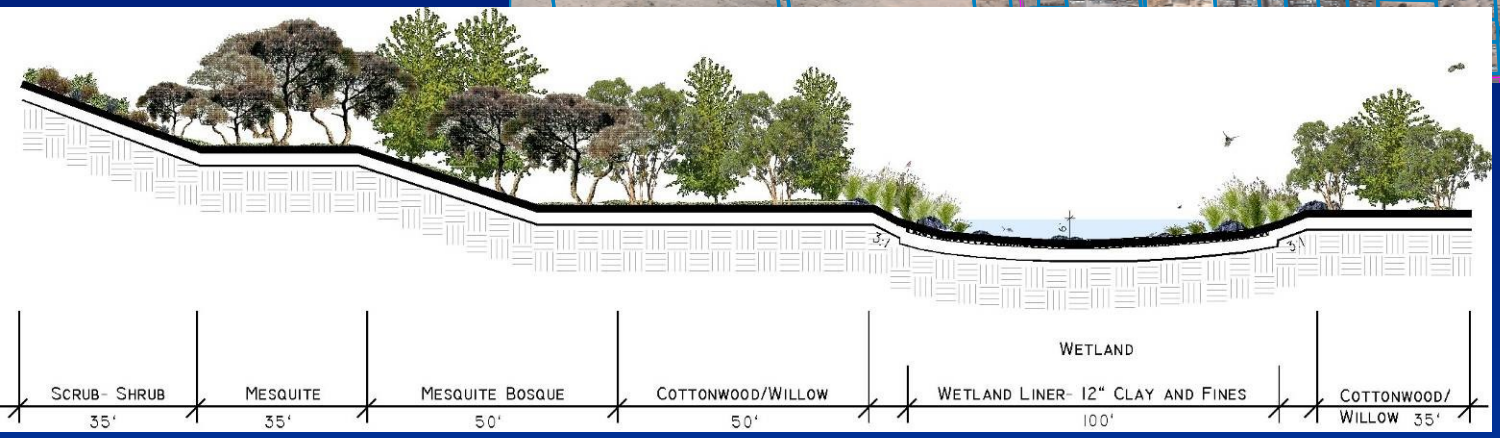
Gravel Pits

27th and 37th Avenues

Reshaping/cut and fill

~3M cy

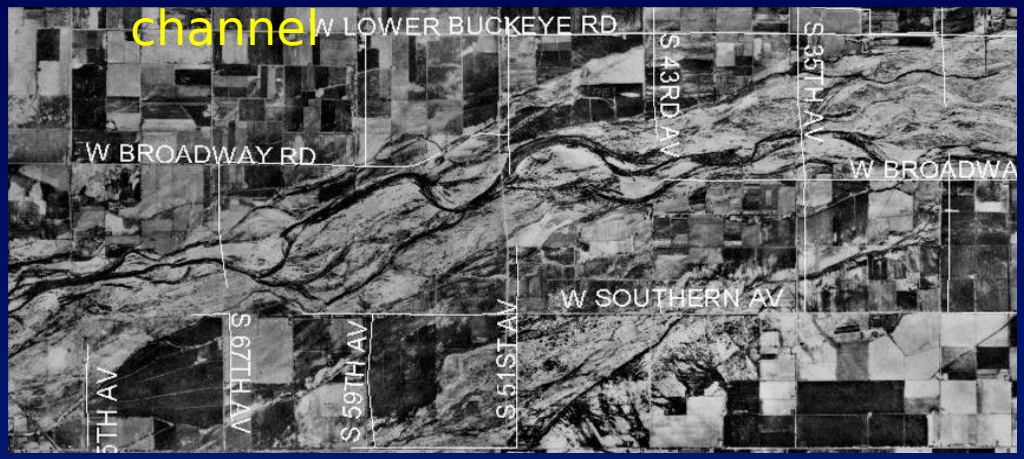
Tie into channel/floodplain



Channel Restoration

Salt River Watershed, **Rio Salado Oeste**, Phoenix, Arizona

Restored river channel *similar* to historical channel



Grading/Terracing within 10 yr

20,200 cfs design discharge

Cut/Fill 660,000 cubic yards

Grade Control at 35th Avenue Bridge